

## When is a drive not a drive?

Phil Banks, large drives product manager at Gambica\* member company Siemens, examines the growing number of uses for variable-speed drives that do not involve a motor.

The quest for new markets for drives is not new, but has become more of a priority with the continuing downturn in traditional VSD markets such as oil and gas. And in Great Britain, the decline of industries such as steel production has not exactly helped our growth aspirations. Naturally these issues also affect the market for industrial motors. And without motors, drives would not need to exist. Or would they?

It was in this very journal around ten years ago that I first read an article by a Gambica member and VSD manufacturer that predicted applications where drives may be installed but never connected to a motor. That seemed strange concept to me for me as a variable-speed drives "sales guy": a VSD with no motor to control?

That article was referring to how the increasing input/output capacities and intelligence of VSDs could potentially be utilised in alternative applications. Since then, as manufacturing techniques have improved, and VSD footprints and costs have reduced, one can indeed foresee a time when a panel-builder or an OEM might control basic processes simply by making use of some of those features, rather than purchasing, for example, an additional PLC.

This trend for multi-functionality has continued apace – these days a basic VSD can have multiple digital inputs and outputs, analogue, serial communication ports, and the capability for user customisation.

"Drives" – or rather converter technologies – are now being used in a much wider range of applications, many of which don't involve controlling the speed and torque of industrial motors. This applies to both AC and DC converters.

For example, thyristor-based DC drives are

being used in non-motor applications in sectors including water treatment (ionisation), glass (furnace control), and oil and gas (cable and pipeline heating). Industrial DC drives have been adapted to provide simple, cost-effective and accurate control of power flow into the load. There's no rotating shaft – but the converter comes from the same production line as a VSD, uses the same HMI or operator panel and programming platform, and has the same serial communications capabilities.

One major consideration when designing and building systems for energy conversion, grid connection and storage is the voltage mismatch between the source, storage and eventual use. Most batteries on the market today are rated from 50–800V. A large wind turbine will typically feed a DC bus output at about 600V, but the chosen storage device may be rated at 500V. A DC/DC converter using IGBT drive technology can sit between the DC link and battery and manage the flow

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One of the key growth markets for drive technologies is renewable energy. Over the past few years, there has been huge demand for drive products in the expanding area of photovoltaics and other forms of solar energy. Energy from the sun is captured, converted and fed into a DC bus. In the same way that an industrial process such as a paper mill might have multiple motor axes controlled by inverter motor modules fed from a DC bus, solar-sourced DC power is fed to an IGBT inverter section and switched into a simulated sinusoidal AC three-phase voltage. This is then fed back into the mains grid.

VSD manufacturers are now exploiting this alternative function for active front-ends (AFE) in existing drives. For example, Siemens uses its Sinamics S120 Active Line Modules designed for industrial regenerative drive systems, in applications where no motor is involved.

This principle can likewise be applied to energy storage. Once you have the technology and capabilities to generate usable electricity from renewable sources such as wind, solar or tidal, it is desirable to be able to store the energy so that it can be used to meet demand on the grid.

of power in both directions, allowing the turbine to feed the grid or charge the battery for storage as demand varies through the day.

Similarly drives can be used for power conversion in hybrid drive systems in buses and for marine propulsion in ferries, for example.

So: when is a drive not a drive? With more and more industries using VSDs for non-motor control applications, the answer is "often". ■



\* Gambica is the trade association for the automation, control, instrumentation and laboratory technology sectors in the UK. For more information, please contact 020 7642 8090 or visit [www.gambica.org.uk](http://www.gambica.org.uk)